A comparison of the Lanczos method and automated substructuring for eigenvalue analysis

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Abstract

Large scale eigenvalue computations are essential components of structural dynamics, especially in the automobile industry. The Lanczos method has been the dominant tool for such computations for more than two decades. The past few years brought industrial acceptance to automated substructuring methods, at least in the automobile industry.

An overview of the evolution and industrial application of the Lanczos method is presented in [1] and a more recent publication on the multi-level automated substructuring technique is [2].

The presentation will compare the computational complexity of the two methods. Practical results with both methods implemented in NASTRAN will be presented. A comparison between the theoretical expectations and practical results will be made.

References

[1] L. Komzsik, "The Lanczos method: Evolution and Application", ISBN 0-89871-537-7, SIAM, 2003

[2] J. Bennighof, M. F. Kaplan, and M. B. Muller, "Extending the frequency response capabilities of automated multi-level substructuring", AIAA-2000-1574, 2000